```
> restart
```

```
> Ecuacion := diff(y(x, t), x$2) − 5·diff(y(x, t), x, t) + 6·diff(y(x, t), t$2) = 0
```

$$Ecuacion := \frac{\partial^2}{\partial x^2} y(x, t) - 5\left(\frac{\partial^2}{\partial x\,\partial t} y(x, t)\right) + 6\left(\frac{\partial^2}{\partial t^2} y(x, t)\right) = 0 \tag{1}$$

```
> Solucion := pdsolve(Ecuacion)
```

$$Solucion := y(x, t) = \_F1(t + 2x) + \_F2(t + 3x) \tag{2}$$

```
> DerUnoX := diff(Solucion, x)
```

$$DerUnoX := \frac{\partial}{\partial x} y(x, t) = 2\,D(\_F1)(t + 2x) + 3\,D(\_F2)(t + 3x) \tag{3}$$

```
> DerDosX := diff(Solucion, x$2)
```

$$DerDosX := \frac{\partial^2}{\partial x^2} y(x, t) = 4\,D^{(2)}(\_F1)(t + 2x) + 9\,D^{(2)}(\_F2)(t + 3x) \tag{4}$$

```
> DerMixta := diff(Solucion, x, t)
```

$$DerMixta := \frac{\partial^2}{\partial x\,\partial t} y(x, t) = 2\,D^{(2)}(\_F1)(t + 2x) + 3\,D^{(2)}(\_F2)(t + 3x) \tag{5}$$

```
> DerDosT := diff(Solucion, t$2)
```

$$DerDosT := \frac{\partial^2}{\partial t^2} y(x, t) = D^{(2)}(\_F1)(t + 2x) + D^{(2)}(\_F2)(t + 3x) \tag{6}$$

```
> Comprobacion₁ := simplify(eval(subs(y(x, t) = rhs(Solucion), Ecuacion)))
```

$$Comprobacion_1 := 0 = 0 \tag{7}$$

```
> SolucionParticular := y(x, t) = 5·exp(t + 3x) − cos(t + 2x)
```

$$SolucionParticular := y(x, t) = 5\,e^{t + 3x} - \cos(t + 2x) \tag{8}$$

```
> Comprobacion₂ := simplify(eval(subs(y(x, t) = rhs(SolucionParticular), Ecuacion)))
```

$$Comprobacion_2 := 0 = 0 \tag{9}$$

```
> restart
```

```
> Ecuacion := diff(z(x, y), x$2) + 2·diff(z(x, y), y, x) + diff(z(x, y), y$2) = 0
```

$$Ecuacion := \frac{\partial^2}{\partial x^2} z(x, y) + 2\left(\frac{\partial^2}{\partial y\,\partial x} z(x, y)\right) + \frac{\partial^2}{\partial y^2} z(x, y) = 0 \tag{10}$$

```
> Solucion := pdsolve(Ecuacion)
```

$$Solucion := z(x, y) = \_F1(y - x) + \_F2(y - x)\,x \tag{11}$$

```
> SolucionAlterna := z(x, y) = F₁(y − x) + y·F₂(y − x)
```

$$SolucionAlterna := z(x, y) = F_1(y - x) + y\,F_2(y - x) \tag{12}$$

```
> Comprobacion₁ := simplify(eval(subs(z(x, y) = rhs(Solucion), Ecuacion)))
```

$$Comprobacion_1 := 0 = 0 \tag{13}$$

```
> Comprobacion₂ := simplify(eval(subs(z(x, y) = rhs(SolucionAlterna), Ecuacion)))
```

$$Comprobacion_2 := 0 = 0 \tag{14}$$

```
> restart
```

```
> Ecuacion := diff(z(x, y), x$2) + 9·diff(z(x, y), y$2) = 0
```

$$Ecuacion := \frac{\partial^2}{\partial x^2} z(x, y) + 9\left(\frac{\partial^2}{\partial y^2} z(x, y)\right) = 0 \tag{15}$$

> $Solucion := pdsolve(Ecuacion)$

$$Solucion := z(x, y) = \_F1(y - 3\,\mathrm{I}\,x) + \_F2(y + 3\,\mathrm{I}\,x) \tag{16}$$

> $restart$

> $Ecuacion := diff(y(x, t), x\$3) - 3 \cdot diff(y(x, t), x, x, t) + 3 \cdot diff(y(x, t), x, t, t) - diff(y(x, t), t\$3) = 0$

$$Ecuacion := \frac{\partial^3}{\partial x^3}\,y(x, t) - 3\left(\frac{\partial^3}{\partial x^2\,\partial t}\,y(x, t)\right) + 3\left(\frac{\partial^3}{\partial x\,\partial t^2}\,y(x, t)\right) - \left(\frac{\partial^3}{\partial t^3}\,y(x, t)\right) = 0 \tag{17}$$

> $Solucion := pdsolve(Ecuacion)$

$$Solucion := y(x, t) = \_F1(t + x) + \_F2(t + x)\,x + \_F3(t + x)\,x^2 \tag{18}$$

> $SolucionDos := y(x, t) = F_1(t + x) + t \cdot F_2(t + x) + x \cdot \cdot 2 \cdot F_3(t + x)$

$$SolucionDos := y(x, t) = F_1(t + x) + t\,F_2(t + x) + x^2\,F_3(t + x) \tag{19}$$

> $Comprobacion := simplify(eval(subs(y(x, t) = rhs(SolucionDos), Ecuacion)))$

$$Comprobacion := 0 = 0 \tag{20}$$

> $SolucionTres := y(x, t) = F_1(t + x) + t \cdot F_2(t + x) + x \cdot t \cdot F_3(t + x)$

$$SolucionTres := y(x, t) = F_1(t + x) + t\,F_2(t + x) + x\,t\,F_3(t + x) \tag{21}$$

> $Comprobacion_1 := simplify(eval(subs(y(x, t) = rhs(SolucionTres), Ecuacion)))$

$$Comprobacion_1 := 0 = 0 \tag{22}$$

> $with(PDEtools)$

$[CanonicalCoordinates, ChangeSymmetry, CharacteristicQ, CharacteristicQInvariants,$ (23)
$\quad ConservedCurrentTest, ConservedCurrents, ConsistencyTest, D\_Dx, DeterminingPDE,$
$\quad Eta\_k, Euler, FromJet, InfinitesimalGenerator, Infinitesimals, IntegratingFactorTest,$
$\quad IntegratingFactors, InvariantSolutions, InvariantTransformation, Invariants, Laplace,$
$\quad Library, PDEplot, PolynomialSolutions, ReducedForm, SimilaritySolutions,$
$\quad SimilarityTransformation, SymmetrySolutions, SymmetryTest, SymmetryTransformation,$
$\quad TWSolutions, ToJet, build, casesplit, charstrip, dchange, dcoeffs, declare, diff\_table,$
$\quad difforder, dpolyform, dsubs, mapde, separability, splitstrip, splitsys, undeclare]$

> $restart$

> $Ecuacion := diff(z(x, y), x\$2) + 5 \cdot diff(z(x, y), y) = 0$

$$Ecuacion := \frac{\partial^2}{\partial x^2}\,z(x, y) + 5\left(\frac{\partial}{\partial y}\,z(x, y)\right) = 0 \tag{24}$$

> $with(PDEtools) :$

> $Solucion := build(pdsolve(Ecuacion))$

$$Solucion := z(x, y) = e^{\sqrt{-c_1}\,x}\,\_C3\,e^{-\frac{1}{5}\,\_c_1\,y}\,\_C1 + \frac{\_C3\,e^{-\frac{1}{5}\,\_c_1\,y}\,\_C2}{e^{\sqrt{-c_1}\,x}} \tag{25}$$

>
>
>
>
>